

WO 2004/029360

PCT/CA2002/081415

APPENDIX**CLAIMS**

1. A papermaking furnish comprising a combination of a solventless cationic polymer retention aid with phenolic resin and polyethylene oxide as a retention
5 system for retaining fines, fillers and other papermaking chemicals in the paper sheet.
2. A papermaking furnish according to claim 1, in which the solventless cationic polymer retention aid is a liquid, aqueous, solventless dispersion of a cationic polymer, without any oil-phase.
3. A papermaking furnish according to claim 2, in which said suspension has a
10 charge density of between 20 and 75 mole %, a solids content of between 2 and 70 wt% and viscosities in water at 1% of between 2000 and 20,000 mPa sec.
4. A papermaking furnish according to claims 1, 2 or 3, in which the amount of the solventless cationic retention aid is 0.05 kg/ton to 10 kg/ton based on the weight of dry fibers; the amount of phenolic resin is 0.05 kg/ton to 10 kg/ton of actual resin
15 in as supplied material per ton of dry fibers; and the amount of polyethylene oxide is 5 g/ton to 500 g/ton based on the weight of dry fibers.
5. A papermaking furnish according to any one of claims 1 to 4, in which the ratio of the solventless cationic retention aid to the phenolic resin is from 200:1 to 1:200; the ratio of the phenolic resin to polyethylene oxide is from 100:1 to 1:100 and
20 the ratio of the solventless cationic polymer retention aid to polyethylene oxide is from 1:2000 to 2000:1.
6. A method of increasing retention rate and/or drainage in a papermaking furnish comprising adding to the furnish an effective amount of a solventless cationic

WO 2004/029360

PCT/CA2003/001415

polymer retention aid in combination with phenolic resin and polyethylene oxide.

7. A method according to claim 6, in which the solventless cationic polymer retention aid is added to the furnish together with the phenolic resin at the same point of addition.

5 8. A method according to claim 6, in which the solventless cationic polymer retention aid is added to the furnish separately from the phenolic resin at a different point of addition.

9. A method according to claims 6, 7 or 8 in which the solventless cationic polymer retention aid and the phenolic resin are added to the furnish before or after
10 the polyethylene oxide addition.

10. A method according to claim 8, in which the solventless cationic polymer retention aid is added last, after the phenolic resin and polyethylene addition and after the last point of shear.

11. A method according to claim 6, further comprising adding a filler to the
15 furnish and pretreating said filler with the solventless cationic polymer retention aid.

12. A method as claimed in claim 11, in which the pretreated filler is dosed into the furnish before the last point of shear and before addition of the polyethylene oxide.